

Making Your Home Safer with a Sealed Combustion Closet

🕒 2011-02-11 👤 Allison Bailes 📁

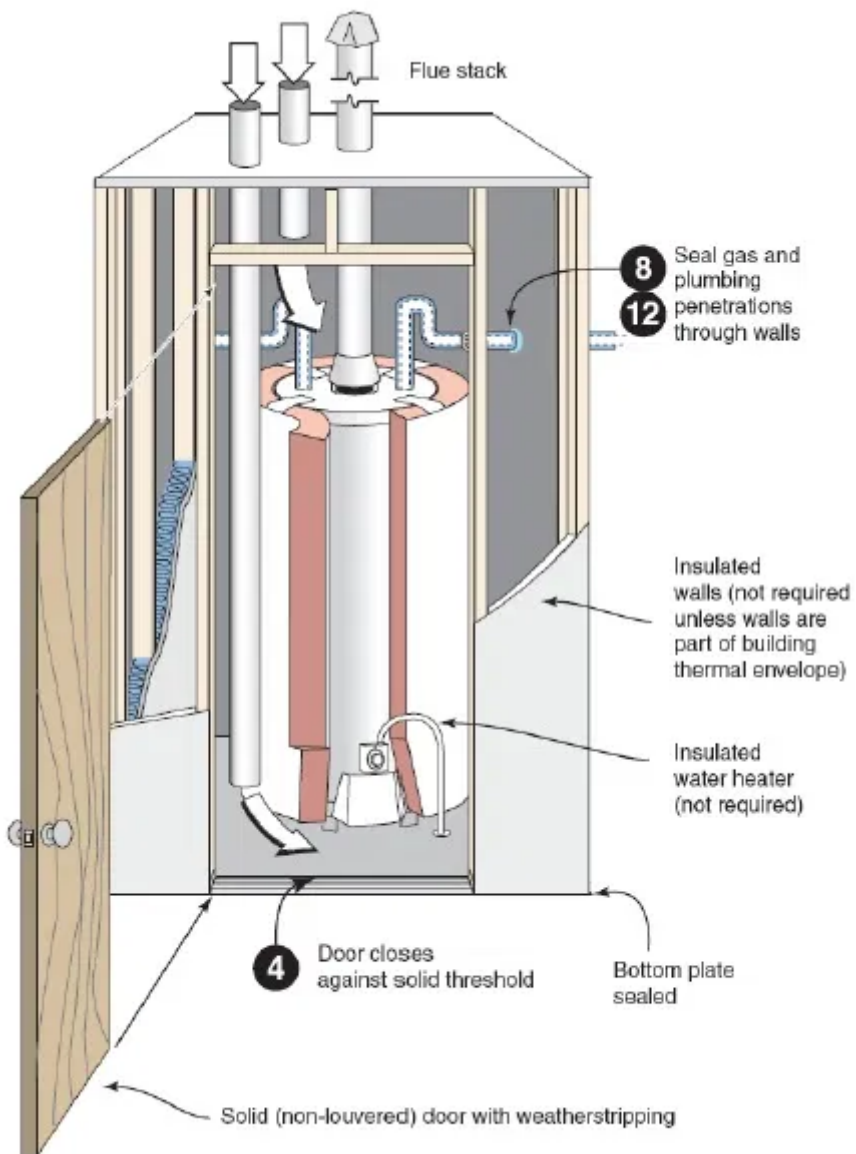
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In yesterday's article, I wrote that [atmospheric combustion appliances should not be inside the conditioned space](#) of a home. If you have a furnace or water heater that draws air from the room, uses it in the combustion process, and then exhausts it to the outside, you could have serious health and safety risks in your home.

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One of the solutions I listed at the end of the article is to enclose the combustion appliances inside a sealed combustion closet. The diagram below (from the [Georgia State](#)

[Supplements and Amendments to the International Energy Conservation Code](#)) shows how this works.



The closet is completely air-sealed to the house, as shown above. The door must have weatherstripping and a threshold to prevent air leakage between the closet and the house. All penetrations must be air-sealed as well.

The key is that you have to install air inlets so that the furnace or water heater gets the combustion air it needs when it's running. Called high-low vents, one must terminate within a foot of the ceiling and the other within a foot of the floor.

The size of the inlets depends on the capacity of the furnace or water heater. There must be one square inch for each 4000 Btu/hour of input capacity. For example, a 100,000 Btu/hr furnace would need 25 square inches of air inlets. These requirements are from the International Mechanical Code (IMC).

Put your atmospheric combustion appliances in such a closet, and you'll be much safer in your home than if you're running those appliances in the conditioned space. Remember this basic rule:

Keep people air and combustion air separate.

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Brad

2011-02-11 at 7:41 pm

I've seen this a number of

I've seen this a number of times and can't disagree with it. However, the introduction of cold/hot outside air into a conditioned space can introduce thermal discomfort through an interior closet. It's probably better than using conditioned indoor air for combustion, but still not ideal.



Are there any better options? Sealed combustion power vent units would work, but can cost twice as much as an atmospheric vent water heater. That might be the best option, but what should someone like me who is stuck with an perfectly good atmospheric vent water heater for a few more years do? Are there conversion kits available?



John Poole

2011-02-11 at 10:41 pm

Allison,

Allison,

I've been enjoying this recent set of combustion safety articles and am finding them (and all the ensuing comments) very useful.

Are you planning to say anything about fireplaces and stoves (i.e., gas or wood stoves) as atmospheric combustion devices at any point? Am very curious to hear your thoughts on fireplaces in particular.

Thanks!

John



Allison Bailes

2011-02-11 at 10:48 pm



Brad, I agree that it's not

Brad, I agree that it's not the best solution overall, but if you've got atmospheric combustion inside the building envelope, it IS the best solution. When you do it properly, the sealed combustion closet isn't really conditioned space anymore. It's a bubble of unconditioned space surrounded by conditioned space.

Although the diagram shows otherwise, I think that closet should be insulated as well because of the introduction of cold/hot air, especially if you're pulling that air from the attic.

The better solutions for combustion safety are to go with sealed combustion, direct vent, power vented, or electric appliances. I don't think you can convert an atmospheric combustion water heater to direct vent, power vented, or sealed combustion, not without a lot of expense that would make it better to go ahead and buy a new one anyway.



Allison Bailes

2011-02-11 at 10:50 pm

John, I'm glad you like these

John, I'm glad you like these articles, and yes, I'll be writing about fireplaces and woodstoves in the next couple of weeks.



Joshua Lloyd

2011-02-12 at 5:28 am

I agree with Brad that this

I agree with Brad that this is not the ideal option because it draws in the hot or cold outside air. But I see this done a lot in condos that I inspect. And every so often I come across pipes that have been plugged up by the home owner because no one explained to them why those vent pipes are there.



Jason Payne

2011-02-12 at 10:56 am

Brad,

Brad,

One idea would be to convert your gas WH to electric using the Geyser heat pump if you have the room for it.



John Snell

2011-02-13 at 2:53 am

I'll be interested to hear

I'll be interested to hear about supplying makeup air to a fireplace. My 20-year old Rumford smokes gloriously until the fire is rip-roaring (we use only spring and fall and occasionally over winter holidays) and even then, if weather is "low," it is not great. I've tried opening the ash pit damper (communicates with the outside) but a gale force wind blows in when I light the fire spewing ash all over.



Laurie

2011-02-22 at 3:11 am

Can this also be done with

Can this also be done with both the furnace and the water heater together in the closet?



Brent Hays

2012-02-23 at 4:28 am

Allison,

Allison,



As a home inspector, I congratulate you for bringing this topic to public attention. Educating the consumer about potential hazards in the home is important work.

I noticed that there should have an “upward” arrow at the vent pipe that terminates within the upper 12” of the closet, NOT a “downward” arrow at each pipe. Hot air rises in the enclosed compartment & exits the higher pipe, causing negative air pressure within the air-tight closet to draw attic air down the lower pipe, providing combustion air to the fuel-burning appliance.

Also, the diagram understates the importance of ensuring that the furnace closet door is sealed in an air-tight manner, both to ensure negative pressure within the closet, and to prevent back-drafting of toxic flue gases through the door unit & into the air intake (presumably & generally located below the closet door).

In my experience, the furnace closet door is often not sealed well, as made evident by dirt deposited on the poorly weather-stripped door jamb.

Again, thanks for bringing this topic up for discussion.

Brent Hays in Austin, TX





Allison Bailes

2012-02-23 at 4:38 am

Brent H.:

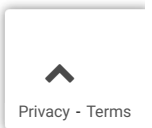
Brent H.: Good catch! Air might well be going up the into the higher pipe when the water heater's not running. When this type of water heater is firing, though, it's pulling air into the bottom for combustion and into the top for aiding the upward draft in the flue. As it pulls in air, the pressure in the room goes negative and can pull air down that higher pipe. At least, that's the idea behind it. Air does funny things sometimes.

And yes, you're absolutely right about the sealing of everything, including the door. If the combustion closet isn't sealed, you could be mixing people air and combustion air, and that's not a good thing.

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